Testimony prepared by
Richard A. Anthes, President of the
University Corporation for Atmospheric Research (UCAR)
Submitted March 19, 2008 to the
Subcommittee on Energy and Water Development and Related Agencies
U.S. House of Representatives Appropriations Committee
Regarding FY 2009 Appropriations for the Department of Energy (DOE) Office of Science

On behalf of the University Corporation for Atmospheric Research (UCAR) and the university community involved in weather and climate research and related education, training and support activities, I submit this written testimony for the record of the House Committee on Appropriations, Subcommittee on Energy and Water Development. We urge you to fund the DOE Office of Science at the requested level of $4.7 billion or higher as authorized by the America COMPETES Act.

UCAR is a 71-university member consortium that manages and operates the National Center for Atmospheric Research (NCAR) and additional programs that support and extend the country’s scientific research and education capabilities. In addition to its member research universities, UCAR has formal relationships with approximately 100 additional undergraduate and graduate schools including several historically black and minority-serving institutions, and over 50 international universities and laboratories. UCAR’s principal support is from the National Science Foundation with additional support from other federal agencies including the Department of Energy (DOE).

DOE Office of Science

The atmospheric and related sciences community is concerned about the final outcome for basic research in many areas of the FY08 Consolidated Appropriations Act, including the DOE Office of Science. We do understand that Appropriators were faced with extremely difficult funding choices, but the negative consequences of not investing now in science that contributes to our economy, standard of living, and safety and security, will only multiply in the future as this country’s global competitors invest on a broader scale than ever before. We appreciate your support for last year’s America COMPETES Act and urge you to reinstate the doubling track for the Office of Science with the FY09 budget, and/or with a supplement to the FY08 budget.

There will surely be immense budget pressures facing you again in your deliberations this year, but we ask that you focus on science as a national priority. We urge you to fund the DOE Office of Science at the requested level of $4.7 billion or higher as authorized by the America COMPETES Act, ask that you make the Office a national priority when difficult choices have to be made at the end of the budget process, and that you enable the agency to apply the entire appropriation toward planned agency research priorities.

Biological and Environmental Research (BER)

Within the Office of Science, the Biological and Environmental Research (BER) program has as a key goal the development of knowledge necessary to identify, understand, and anticipate the
potential health and environmental consequences of energy production and use. These are goals that are essential to our country’s well being and security. Peer-reviewed research programs at universities, national laboratories, and private institutions play a critical role in the BER program by involving the best researchers the nation has to offer, and by developing the next generation of researchers. All BER research projects, other than those that have been in the “extra projects” category, undergo regular peer review and evaluation.

I urge the Subcommittee to fund Biological and Environmental Research at the level of the FY09 Budget Request, $568.9, a 4% increase over the FY08 level, and to enable BER to apply that entire amount toward planned agency research priorities that are peer-reviewed and that involve the best researchers to be found within the nation’s university research community as well as the DOE labs.

BER’s Climate Change Research Program

Within BER, the Climate Change Research subprogram addresses some of the most critical research priorities facing the world today including developing the ability to predict climate change and its impacts on global and regional scales, exploring the impacts of high levels of CO₂ on the Earth system, and providing the scientific foundation necessary to help mitigate those impacts.

One example of the compelling work being done is a BER contribution to the International Polar Year (IPY) utilizing the Community Climate System Model to simulate eight future emission scenarios. The results projected a decline in sea ice, with one scenario showing the Arctic becoming ice-free in summer at the end of this century – an occurrence that could change sea level, economies, world trade, and political stability. Such advanced modeling activities supported by the BER Climate Change Research are obviously critical to our understanding of the current global climate and areas that are being transformed by rapid change, but they are also critical to our understanding of what a changed world may look like in the very near future.

In 2009, Climate Change Research funded work will continue to focus on resolving the role of clouds and aerosols in climate change and their interaction with solar radiation. While great progress has been made in recent years, this remains one of the greatest scientific uncertainties in climate change prediction. As we learn more about climate change and the anthropogenic influences that are forcing change at an unnatural rate, those results must be made accessible to researchers working to understand the regional and local impacts that climate change will produce. A new Climate Change Research effort is strengthening the connections between the climate modeling research communities and those that address integrated assessment of impacts in addition to exploring adaptation methods. To be of use at regional scales (where details make tremendous differences at local ecosystem levels where we all live), models must be resolved at ever higher resolutions to project local impacts with any reasonable certainty. Running models at these resolutions presents complex problems of data retrieval, archiving, analysis, and dissemination for which BER is developing the tools and capabilities necessary.

The Climate Change Research goal to deliver improved regional climate data and models is critical to the ability of policy makers and stakeholders to provide stewardship resulting in a
healthy planet – and it is particularly important as signs of increasingly dramatic change in our climate and environment continue to appear.

The Climate Change Research Request of $154.9 million for FY09 is a 13.2 percent increase over FY 2008 which will make up some of the ground lost in previous years. Within this amount, Climate Change Modeling receives $45.4 million -- a critical 46 percent increase over FY08. These additional resources are absolutely necessary for the work that must be accelerated at the regional level. I urge the Subcommittee to fund Climate Change Research at the FY09 requested level of $154.9 million, and to enable DOE to apply the entire amount toward planned national research priorities.

Advanced Scientific Computing Research (ASCR)

Within DOE’s Office of Science, Advanced Scientific Computing Research (ASCR) delivers leading edge computational and networking capabilities to scientists nationwide, enabling advances in computer science and the development of specialized software tools that are necessary to research the major scientific questions being addressed by the Office of Science. Development of this capacity is a key component of DOE’s strategy to succeed in its science, energy, environmental quality, and national security missions.

ASCR’s continued progress is of particular importance to atmospheric scientists involved with complex climate model development, research that takes enormous amounts of computing power to address the interaction of the earth’s systems and global climate change. ASCR is one of the most important resources supporting climate work in this country.

Within ASCR, several programs are of particular importance to climate change computer modeling work, particularly through the development of complex software. The Leadership Computing Facility (LCF) at Oak Ridge National Laboratory (ORNL) provides a high performance computing resource and, in 2009, will continue the development of its world class facility with over 80% of its resources being made available to unclassified scientific research. In addition, the National Energy Research Scientific Computing Center (NERSC) operated by Lawrence Berkeley National Laboratory, and the Energy Sciences Network (ESnet) are also important enablers for climate research, as is Argonne National Laboratory (ALCF) which is strengthening its infrastructure to prepare for future computing capacity. These computational and networking resources play a vital role in the progress of U.S. climate research.

The high performance computing facilities for the Office of Science serve thousands of scientists throughout the country at laboratories, universities, and other Federal agencies. Computing time is awarded to research groups based on peer review of submitted proposals. Basic research accomplished at these facilities covers a wide range of disciplines including climate modeling. ESnet enables researchers at laboratories, universities and other institutions to communicate with each other using collaborative capabilities that are unparalleled. This high-speed network enables geographically distributed research teams to collaborate effectively on some of the world’s most complex problems. Researchers from industry, academia and national labs, through this program,
share access to unique DOE research facilities, support the frequent interactions needed to address complex problems, and speed up discovery and innovation.

LCF, NERSC, and ESnet play complementary roles in advancing the complex and challenging science of climate change and other scientific areas of extreme importance to the security and quality of life of our citizens. I urge the Committee to support the President’s FY09 request of $368.82 million for DOE Advanced Scientific Computing Research, a 5 percent increase over FY08, and to enable DOE to apply the entire amount toward planned national priorities.

Scientific Discovery Through Advanced Computing (SciDAC)

BER and ASCR (through its Computational Partnerships program) partner to support Scientific Discovery Through Advanced Computing (SciDAC), a progressive program that provides the innovations in computational research and development for petascale computational and data management endeavors, including climate research. Along with very broad scientific applications, a current SciDAC goal is to break through the uncertainty still challenging researchers concerning the role of clouds and aerosols in climate change. Additional SciDAC investments address the role of land-ice in the climate system, improved representation of ice sheets in global circulation models, and understanding of climate extremes in a changing climate. Much of the research is designed to provide global community access to the data for impact studies as well as national and international assessments (e.g., the Intergovernmental Panel on Climate Change) concerning the consequences of global warming. This work is becoming increasingly critical as evidence mounts that regions of Earth are warming at an alarming rate. SciDAC research activities are competed through a merit review process and carried out via a synthesis of talent drawn from universities, national laboratories, and private institutions.

BER funding for SciDAC is requested at $7.7 million for FY09 with ACSR supporting SciDAC Computational Partnerships at $52.0 million. I urge the Committee to support the President’s FY08 requests within BER and ASCR for overall SciDAC funding.

* * * * * * * * * * * * *

DOE plays a vital role in sustaining U.S. scientific leadership and generating U.S. competitiveness in a time when other countries are investing heavily in scientific research and technology. On behalf of UCAR and the atmospheric sciences research community, I want to thank the Subcommittee in advance for your attention to the recommendations of our community concerning the FY 2009 budget of the Office of Science. We understand and appreciate that the nation is undergoing significant budget pressures at this time, but we believe that U.S. security and quality of life suffer when science is not supported. We urge you to follow the recommendations of the 2007 America COMPETES Act and restore Office of Science and overall DOE funding to a level that benefits this nation.